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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/050,322	01/15/2002	Ming Huan Tsai	67,200-613	3498

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EXAMINER

DUDA, KATHLEEN

ART UNIT PAPER NUMBER

1756

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/050,322	TSAI ET AL.	
Examiner	Art Unit	
Kathleen Duda	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 March 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3, 5, 7, 11-13, 21-26 and 30-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 7, 11-13, 21-26 and 30-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3, 5, 7, 11-13, 21-26 and 30-38 are pending in this application.

2. On page 10 of the response dated March 18, 2004, Applicant refers to amendments to the specification. No amendments to the specification were received with this response.

Claim Objections

3. Claim 32 is objected to because of the following informalities: Claim 32, line 6, recites "from" which should be "form". Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 7 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is indefinite because it depends on claim 6, which has been cancelled. It appears claim 7 should depend on claim 1.

Claim 11 is indefinite because it depends on claim 10, which has been cancelled. In addition, there does not appear to be antecedent basis for the claim language in any of the preceding claims. It is not clear what claim it should depend on.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 3, 5, 7, 11-13, 21, 23-26 and 30-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohuchi (US Patent 6,576,562).

Ohuchi discloses a method for making a semiconductor device using a resist mask pattern. Interlayer insulating film 202 is formed on a silicon substrate 201, followed by barrier film 203, first metal wiring layer 204, barrier film 205 and interlayer insulating layer 206. Organic base film 207 (first resist layer), organic silicon oxide film 208 and photoresist 209 (second resist layer) are then formed. Organic base layer 207 is formed for example

of polyarylene, phenol novolac or aromatic polycyclic resin (column 23, line 22 to column 24, line 24). Instead of using the multilayered resist system, it is permissible to form a mask pattern using two layers. If two layers are used, the upper photoresist layer will contain an inorganic component such as silicon. The upper photoresist layer containing the inorganic component such as silicon is exposed to light through a mask and developed using a development solution (wet developing). The pattern in the upper resist layer is transferred to the lower organic base film using a dry etching process such as RIE using a gas mixture of Oxygen (O₂) and nitrogen (N₂) (column 29, line 13 to column 30, line 8). The upper photoresist layer is removed (ashed) during the etching of the lower resist layer, followed by etching of the underlying layers to transfer the pattern and form the via hole (column 26, lines 33-56). Examples of suitable exposure wavelengths of the method include 193 nm and 157 nm (column 14, lines 42-54). The lower organic base film 207 is formed at a thickness of 500 nm to 5000 angstroms (column 24, lines 8-10), while the upper photoresist is formed at a thickness of 300nm to 3000 angstroms (column 25, lines 40-43).

Applicant argues that Ohuchi teaches away from the invention since it discloses metals in addition to silicon. The fourth embodiment exemplifies the use of silicon and a silylation process.

Applicant argues that wavelengths other than the claimed wavelengths are used for exposure. The wavelengths claimed are taught by the reference. In addition, claims 1, 3, 7, 11, 12, 13, 21 and 22-24, do not recite a wavelength limitation.

Applicant argues that the bilayers are not removed at the same time as the etching as recite in Ohuchi. The claim language does not require that the layers be removed after the etching or that a separate step for their removal occur. In-situ removal can occur during the etching process.

Applicant argues that the ashing process is not disclosed. The claim language does not require a separate distinct removal step.

Applicant argues that the range of the thicknesses of the layers allows the lower layer to be thinner than the upper layer. The same thing occurs in Applicant's claimed ranges.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohuchi as applied to claim above, and further in view of Smith (US Patent 6,388,226).

The teachings of Ohuchi have been discussed above. Ohuchi does not disclose having argon in the plasma mixture. Smith teaches that adding a noble gas such as argon to a mixture of O₂ and N₂ will allow the reactive species to be more efficiently transported and therefore will increase the photoresist removal rate (column 15, lines 29-65). It would have been obvious to one of ordinary skill in the art to have added argon to a N₂/O₂ plasma mixture in the method of Ohuchi because Smith teaches that adding a noble gas such as argon to a mixture of O₂ and N₂ will allow the reactive species to be more efficiently transported and therefore will increase the photoresist removal rate.

Applicant argues that Smith does not teach a N₂/O₂ plasma and adds argon to the plasma. Smith teaches the plasma as claimed. Paragraph 0040 on page 21 of the specification teaches the argon in the N₂/O₂ plasma.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE**

FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication should be directed to Examiner K. Duda at (571) 272-1383. Official FAX communications should be sent to (703) 872-9306.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff, can be reached at 571-272-1385.

Information regarding the status of an application may be obtained from the Patent Application Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through

Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kathleen Duda
Primary Examiner
Art Unit 1756